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| EXAMINER | |
|---|---|
| CURS, NATHAN M | |

| ART UNIT | PAPER NUMBER |
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| 2613 | |

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/783,002 | GRAVES ET AL. | |
| | Examiner | Art Unit | |
| | Nathan Curs | 2613 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *24 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3 and 10-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 10-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 11, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tshushima et al. (US Patent No. 6424445) in view of Eggleton et al. (US Patent No. 6370300), and further in view of Fukashiro et al. (US Patent No. 6362905).

Regarding claims 1 and 20, Tsushima et al. disclose a photonic network node comprising: means for demultiplexing an optical signal into channels (fig. 16, elements 201); photonic switch fabric (fig. 16, element 123); and means for multiplexing a plurality of channels into an optical signal (fig. 16, elements 202). Tsushima et al. do not disclose means for reducing a variance between inputs to the photonic network node by applying dynamically adjusted bulk compensation to all channels of the optical signal. Eggleton et al. disclose a photonic network node comprising: means for reducing a variance between inputs of an optical signal received at a photonic node by applying dynamically adjustable bulk compensation to all channels of the multiplexed signal (fig. 2 and col. 4, lines 14-43 and col. 4, line 65 to col. 5, line 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to use adjustable bulk compensation at the multiplexed input signal entering the node of Tsushima et al, in order to variably compensate for wavelength dispersion accumulated in the network due to non-linear effects and environmental changes in the network, as taught by Eggleton et al.

(col. 2, lines 41-54). The combination of Tsushima et al. and Eggleton et al. do not disclose means for monitoring before and after the photonic switch fabric. Fukashiro et al. disclose a photonic node comprising means for performance monitoring on each one of a plurality of channels of the optical signal before and after a cross-connect (fig. 11, elements 24 and col. 13, lines 36-50). It would have been obvious to one skilled in the art at the time of the invention to use the optical cross-connect disclosed by Fukashiro et al., as the optical crossconnect of the optical node of Tshusima et al., to provide the benefits of individual signal performance monitoring for the individual signal channels, as taught by Fukashiro et al. Also, the combination of Tsushima et al., Eggleton et al. and Fukashiro et al. does not disclose means for performing dynamically adjustable amplitude impairment compensation on each one of the plurality of channels of the optical signal, responsive to monitoring of each channel and based at least in part on output carrier power. However, in another embodiment, Fukashiro et al. disclose an optical switch fabric where amplifiers are provided between some of the outputs and inputs of the switch input and output modules, to provide the option of monitoring-based amplifying of a switched signal(s) before outputting the switched signal(s) from the optical switch (fig. 1 and col. 5, lines 25-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the monitoring-controlled amplifiers taught by Fukashiro et al. with the optical switch of the combination of Tsushima et al., Eggleton et al. and Fukashiro et al., in order to provide the benefit of amplifying some switched signals before they are output from the optical switch in response to monitoring information for the signals, as taught by Fukashiro et al.

Regarding claim 2, the combination of Tsushima et al., Eggleton et al. and Fukashiro et al. disclose that the photonic switch fabric includes a plurality of optical switch planes, including switching groups of wavelengths (Tsushima et al.: fig. 14 and 15 and col. 13, line 36 to col. 14,

line 11) as well as individual demultiplexed wavelengths (Tsushima et al.: fig. 16 and col. 14, lines 12-34).

Regarding claim 11, the combination of Tsushima et al., Eggleton et al. and Fukashiro et al. disclose means for monitoring including channel performance monitors (Fukashiro et al.: fig. 11, elements 24 and col. 13, lines 36-50).

Regarding claim 12, the combination of Tsushima et al., Eggleton et al. and Fukashiro et al. disclose mean for protecting channels of the optical signal responsive to the monitoring means (Tsushima et al.: fig. 16 and col. 13, lines 36-50).

3. Claims 3 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tshushima et al. (US Patent No. 6424445) in view of Eggleton et al. (US Patent No. 6370300), and further in view of Fukashiro et al. (US Patent No. 6362905), as applied to claims 1, 2, 11, 12 and 20 above, and further in view of Patterson et al. (US Patent No. 6356684).

Regarding claims 3 and 21, the combination of Tsushima et al., Eggleton et al. and Fukashiro et al. disclose the node as claimed in claims 1 and 20, respectively, but do not disclose additional means for dynamically adjustably compensating for individual channel chromatic dispersion impairment. Patterson et al. disclose individual channel, dynamically adjustable, dispersion compensators in a WDM node that are controlled based on a tapped channel power feedback signal (figs. 13 and 16 and col. 9, lines 48-65, col. 10, lines 5-21 and col. 11, lines 14-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to add individual channel variable compensators to each demultiplexed channel of Tsushima et al., in order to provide the benefit of compensating for any individual wavelength dispersion that may need compensation based on performance monitoring information for the individual wavelength.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima et al. (US Patent No. 6424445) in view of Eggleton et al. (US Patent No. 6370300), and further in view of Fukashiro et al. (US Patent No. 6362905), as applied to claims 1, 2, 11, 12 and 20 above, and further in view of Harley et al. (US Patent No. 6323978).

Regarding claim 10, the combination of Tsushima et al., Eggleton et al., and Fukashiro et al. does not disclose that the means for monitoring includes wrapper readers. Harley et al. disclose an optical channel overhead, used as a communication channel for remote monitoring between transmitters and receivers (col. 1, lines 12-42), and an optoelectronic converter for detecting an optical signal having an embedded control signal and demodulating the control signal to produce control information (col. 3, lines 26-39). It would have been obvious to one skilled in the art at the time of the invention to use optical channel overheads as disclosed by Harley et al., in the system of the combination of Tsushima et al., Eggleton et al., and Fukashiro et al., for end-to-end channel monitoring and controlling channel routing.

5. Claims 13, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukashiro et al. (US Patent No. 6362905) in view of Eggleton et al. (US Patent No. 6370300).

Regarding claim 13, Fukashiro et al. disclose a multi-channel photonic node comprising means for performance monitoring on each one of a plurality of channels of the optical signal (fig. 11 and col. 13, lines 36-50) and means for protecting channels responsive to the monitoring means (fig. 4 and col. 7, lines 4-41; and fig. 11 and col. 13, line 51 to col. 14, line 10) and WDM compatibility (col. 8, lines 46-52), but do not disclose means for reducing a variance between inputs to the photonic network node by applying dynamically adjusted bulk compensation to all channels of the optical signal. Eggleton et al. disclose a multi-channel photonic network node

comprising: means for reducing a variance between inputs of an optical signal received at a photonic node by applying bulk compensation to all channels of the optical signal before demultiplexing an optical signal into a plurality of channels (fig. 2 and col. 4, lines 14-43 and col. 4, line 65 to col. 5, line 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to use adjustable bulk compensation at the multiplexed input signal entering the node of Fukashiro et al., in order to variably compensate for wavelength dispersion accumulated in the network due to non-linear effects and environmental changes in the network, as taught by Eggleton et al. (col. 2, lines 41-54). The combination of Fukashiro et al. and Eggleton et al. do not disclose means for performing dynamically adjustable amplitude impairment compensation on each one of the plurality of channels of the optical signal, responsive to monitoring of each channel and based at least in part on output carrier power. However, in another embodiment, Fukashiro et al. disclose an optical switch fabric where amplifiers are provided between some of the outputs and inputs of the switch input and output modules, to provide the option of monitoring-based amplifying of a switched signal(s) before outputting the switched signal(s) from the optical switch (fig. 1 and col. 5, lines 25-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the monitoring-controlled amplifiers taught by Fukashiro et al. with the optical switch of the combination of Fukashiro et al. and Eggleton et al., in order to provide the benefit of amplifying some switched signals before they are output from the optical switch in response to monitoring information for the signals, as taught by Fukashiro et al.

Regarding claim 16, the combination of Fukashiro et al. and Eggleton et al. disclose that the means for monitoring include means for detecting and isolating photonic node specific faults and mis-connects, and means for triggering protection switching to redundant modules when appropriate (Fukashiro et al.: col. 7, lines 4-41; and col. 13, line 51 to col. 14, line 10).

Regarding claim 17, the combination of Fukashiro et al. and Eggleton et al. disclose that the means for monitoring includes photonic node output channel power level compensation responsive thereto (Fukashiro et al.: fig. 4 and col. 7, lines 4-41; col. 1, line 64 to col. 2, line 12; and col. 2, lines 29-39).

6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukashiro et al. (US Patent No. 6362905) in view of Eggleton et al. (US Patent No. 6370300), as applied to claims 13, 16 and 17 above, and further in view of Tsushima et al. (US Patent No. 6424445).

Regarding claim 14 and 15, the combination of Fukashiro et al. and Eggleton et al. discloses monitoring in the optical cross-connect used to control protection switching (Fukashiro et al.: col. 7, lines 4-41; and col. 13, line 51 to col. 14, line 10), but do not disclose a supervisory channel used for communicating between nodes and for controlling the optical cross-connects. Tsushima et al. disclose an optical node where a supervisory channel is used for communicating between nodes and for controlling the optical cross-connects (Tsushima et al.: abstract and col. 1, lines 14-35). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a supervisory channel, as disclosed by Tshushima et al., between multiple nodes of the combination of Fukashiro et al. and Eggleton et al. to communicate monitoring and control information between nodes for network wide performance and fault management, and the triggering of network wide protection and restoration.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukashiro et al. (US Patent No. 6362905) in view of Eggleton et al. (US Patent No. 6370300), as applied to claims 13, 16 and 17 above, and further in view of Patterson et al. (US Patent No. 6356684).

Regarding claim 18, the combination of Fukashiro et al. and Eggleton et al. do not disclose that the means for monitoring includes photonic node output channel dispersion compensation responsive thereto. Patterson et al. disclose individual channel, dynamically adjustable, dispersion compensators that are controlled based on a tapped channel power feedback signal (figs. 13 and 16 and col. 9, lines 48-65, col. 10, lines 5-21 and col. 11, lines 14-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to add individual channel variable compensators to each channel of Fukashiro et al., in order to provide the benefit of compensating for any individual channels dispersion that may need compensation based on performance monitoring information for each channel.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukashiro et al. (US Patent No. 6362905) in view of Eggleton et al. (US Patent No. 6370300), as applied to claims 13, 16 and 17 above, and further in view of Chaudhuri et al. (US Patent No. 6587235).

Regarding claim 19, the combination of Fukashiro et al. and Eggleton et al. discloses a node with an optical cross-connect, but do not disclose means for interfacing with electrical signaling network nodes. Chaudhuri et al. disclose a node with an optical cross-connect, including interfaces with electrical signals using electrical-to-optical conversion (fig. 5; col. 5, lines 22-36). It would have been obvious to one skilled in the art at the time of the invention to use electrical-to-optical conversion disclosed by Chaudhuri et al., in the node of the combination of Fukashiro et al., Eggleton et al. and Patterson et al., in order to interface with electrical signals in addition to optical signals.

***Response to Arguments***

9. Applicant's arguments filed 24 January 2006 have been fully considered but they are not persuasive.

Regarding claims 1-3 and 10-21, the applicant argues that "knowledge of" bulk compensation (e.g. Eggleton et al.) and individual compensation (e.g. Fukashiro et al.) techniques "does not provide any motivation to combine them in the claimed manner". This argument is not persuasive in overcoming the rejections, because the motivation for combining the teachings of Eggleton et al. and Fukashiro et al. with Tsushima et al. is not based on knowledge of the techniques (i.e. is not based on the mere existence of the references), but rather on the advantages provided by combining the teachings as described above in the rejections.

The applicant also argues that it is counter-intuitive to compensate twice because adding stages to a switch increases cost and complexity, and that Eggleton et al. and Fukashiro et al. teach only one compensation stage and do not suggest a second compensation stage. This argument is not persuasive because Eggleton et al. and Fukashiro et al. are teaching different types of compensation. The applicant's argument of a second compensation stage being counter-intuitive does not makes sense in this case. There is nothing counter-intuitive about combining the teachings of Eggleton et al. and Fukashiro et al. with Tsushima et al., because Eggleton et al. and Fukashiro et al. are teaching compensation of different optical signal characteristics from one another, in other words, they are addressing different problems. Specifically, Eggleton et al. is teaching bulk dispersion compensation and Fukashiro et al. is teaching individual channel amplitude compensation.

The applicant also argues that the motivation for combining Eggleton et al. with Tsushima et al. "misses the point because individual compensation could also correct for dispersion". However, the applicant does not clarify what "the point" is in relation to the claimed

subject matter and does not further argue how the combination either fails to read on the claimed subject matter or is otherwise improper (aside from the non-persuasive argument regarding "second stage" compensation already addressed above). Further, the argument is not persuasive because the existence of additional ways for compensating dispersion (i.e. "individual compensation" as asserted by the applicant) outside the applied scope of the reference teachings is irrelevant to the obviousness or not of a combination based on the merits of those teachings.

The applicant also argues that the references do not discloses the same reasons for employing two stages of compensation in an optical switch as recited by the applicant in claims 1, 13 and 20 and as disclosed by the applicant in specification pages 10-11. However, claims 1, 13 and 20 are apparatus claims and do not contain any limitations that consist of reasons for two stage compensation. Further, limitations from the specification are not read into the claims. Further, the reason or motivation to modify a reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Conclusion***

11. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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